AD511 Active Iridium Antenna User Manual

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AD511 Active Iridium Transmitter/Receiver Antenna with up to 160 metres of coaxial down-lead and DC Power Break-In Box for Iridium Satellite Systems

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FCC Approval

FCC 15.19 (a) (3)

This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:-

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

FCC 15.105 (b)

The equipment has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:-

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Conformité aux norms FCC Cet equipment a ete teste et trouve conforme aux limites pour un dispositive numérique de Classe B, conformément à la Partie 15 des règlements de la FCC. Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles dans une installation résidentielle.
Cet équipement génère, utilise et peut émettre des fréquences radio et, s'il n'est pas installé et utilisé conformément aux instructions du fabricant, peut causer des interférences nuisibles aux communications radio.
Rien ne garantit cependant que l'interférence ne se produiront pas dans une installation particulière. Si cet équipement provoque des interférences nuisibles à la réception radio ou télévision, ce qui peut être déterminé en allumant et en éteignant, l'utilisateur est encouragé à essayer de corriger l'interférence par un ou plusieurs des mesures suivantes: -

- Réorienter ou déplacer l'antenne de réception.
- Augmenter la distance entre l'équipement et le récepteur.
- Brancher l'équipement dans une prise sur un circuit différent de celui auquel le récepteur est connecte
- Consulter votre revendeur ou un technicien radio / TV pour assistance.

ICES-003:

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Classe B est conforme a la norme NMB-003 du Canada.

User Manual Notice for License-Exempt Radio Apparatus

This devise complies with Industry Canada license-exempt RSS Standard(s).
Operation is subject to the following two conditions:-

(1) This device may not cause interference, and
(2) This device must accept any interference, including interference that may cause undesired operation of the device

Cet appareil et conforme avec Industrie Canada exempts de licence RSS standard (s).
Son fonctionnement est soumis aux deux conditions suivantes: -

(1) Ce appareil ne peut causer des interférences, et
(2) Cet appareil doit accepter toute interférence, y compris des interférences qui peuvent provoquer un fonctionnement indésirable du périphérique.

Introduction

Iridium telephones were originally designed to operate with a passive antenna, either an element attached directly to the handset, or a remote aerial connected with a short length of coaxial cable. Unfortunately, a signal loss of more than 3dB in a remote antenna's connecting cable degrades performance due to attenuation of both the received and transmitted signals. A 3dB loss corresponds to approximately 10m of RG213U or 3m of RG58U coaxial cable, lengths that clearly restrict the mounting options for the antenna using standard down-leads.

AD511 active Iridium antenna (figure 1 & figure 2) is designed for use with up to 160 meters of coaxial cable terminated with type 'N' connectors, and with coax lengths starting from 27meters – subject to AST advice.

Designed for harsh environments, the AD511 consists of two RHCP dipole antenna housed within a 4mm thick GRP radome mounted on a common base. One antenna is for signal transmission and one for reception.

AD511 has a linear power amplifier within the base and connected to the transmitting antenna compensates for signal loss incurred mainly by the connecting cable. Similarly, a low noise amplifier is attached to the receiving antenna via a low loss ceramic filter to boost the signal sent to the telephone. The ceramic filter has a bandwidth of 25 MHz centred on the Iridium band designed to attenuate any out of band interference that may arise, for example from nearby Inmarsat uplinks.

Using manufacturing techniques proven for a range of extremely rugged GPS/DGP active antenna, the base is milled from aluminium and hard anodised, giving an attractive finish, which is mechanically resilient and resistant to corrosion. The antenna's mass is 0.8kg.

Mounting and Operation

AD511 should be mounted with an unobstructed view of the sky. An aluminium bracket with V-bolts is provided to attach the antenna to horizontal or vertical masts or spars up to 60mm in diameter, figure 2. The bracket is shipped inverted on the end of the AD511 antenna and should be detached, turned over, then repositioned either to the centre or end of the antenna case as required using the mounting holes in the base.

The coaxial down-lead is attached to the N-type connector on the underside of the antenna, figure 2. Wrapping the connectors with self-amalgamating tape is recommended for permanent installations and the cable should be taped or strapped to the spar as appropriate.

AD511 antenna supplied with coaxial down-leads must be used with the accompanying AD510-40 DC Power Break-In Box (figure 3), which accepts +18V to +36V DC at 500mA. The down-lead must not be shortened by the user.

AD510-40 Power Break-In should be positioned close to the telephone base-station or handset. The coaxial down-lead is then attached to the N type connector on the AD510-40 (figure 3 & figure 4).

Earthing: - the AD-510-40 power breaking box is provided with an earth terminal. The box should be earthed via this connection with a short earthing lead connection to the system earth.

Connection between the telephone and the AD510-40 is made with a coaxial cable terminated with TNC connectors. An adapter is provided with the Iridium handset, which enables a TNC terminated cable to be attached to the telephone. AD510-40 case has drilled flanges to enable permanent fixing.

A 3m flying lead for the AD510-40 Power Break-In Box is provided for connection to the DC supply (+18 to 36 v DC at 500mA), which can be trimmed (or extended) if necessary. The red wire is connected to supply positive, whilst the blue wire is for either an isolated or grounded negative supply. AD510-40 is

protected against output short-circuiting by a fuse, which is resettable by disconnecting the unit from the +18 to +36 v DC supply.

With all connections made, the telephone can then be turned on and used as normal - it is transmitting into a load impedance equivalent to a matched passive antenna. The gains of the antenna transmitter and receiver are factory set to compensate for the total attenuation between the telephone and the antenna, mainly determined by the coaxial down-lead. Consequently, the signal output level and frequency from the antenna is equivalent to that radiating from a passive antenna mounted directly on the handset, subject to the antenna transmitter being a linear device. Transmitter linearity is verified with test protocols using an HP 8591 EMC analyser that also ensure there are no spurious out of band emissions.

Figures

Figure 1. AD511 Active Iridium antenna

Figure 2. AD511 Active Iridium antenna with mounting bracket and coaxial down-lead

Figure 3. AD510-40 Power Break-In Box for use with +18 to +36 v DC supply.

The case is hard anodised aluminium and has fixing flanges. A 40m coil of RG213U cable is shown connected to an AD511 active antenna (top). The handset interconnect is shown trailing from the TNC to the bottom left, whilst the flying lead for connection to 18 to 36 v DC supply is shown cutting the frame to the left.

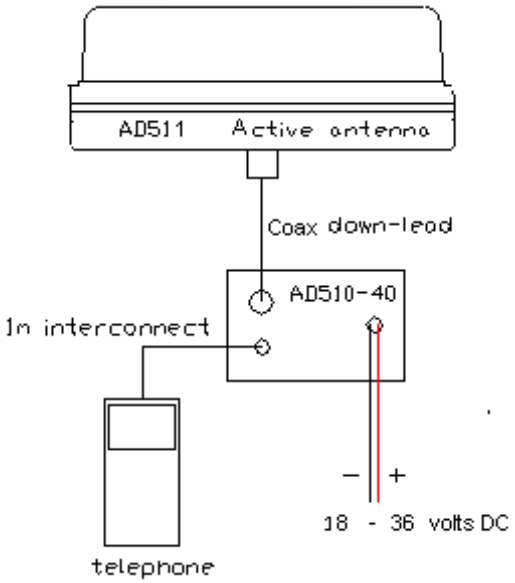

Figure 4. Schematic diagram for system connections

- Mount AD511 active antenna with clear view of sky using bracket supplied.
- Attach top end of coax down-lead to N type connector on underside of antenna.
- Attach bottom end of down-lead to N type connector to the Power Break-In Box AD510-40 . **The down-lead must not be shortened by the user**.
- Attach interconnect between TNC on AD510-40 and telephone (or base station) using the antenna adapter provided with the phone.
- Attach DC supply lead to +18 to +36 v DC supply (600mA max). Red lead to +supply, Blue to –supply.
- Turn on Iridium telephone and log-in.